

SVKM's Narsee Monjee Institute of Management Studies
Mukesh Patel School of Technology Management & Engineering

Program: B. Tech. (I.T., Computer, EXTC, Mechanical, Civil, Mechatronics, Data Science)				Semester: I		
Course/Module: Mathematics-I				Module Code: BTIT01001, BTCT01001, BTET01001, BTME01001, BTCTI01001, BTMA01001, BTDS01002		
Teaching Scheme				Evaluation Scheme		
Classroom Session	Lecture (Hours per week)	Tutorial (Hours per week)	Practical/ Group work (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100 in Question Paper)
45	3	1	0	4	Marks Scaled to 50	Marks Scaled to 50
Course Rationale: This course aims at providing adequate exposure to the theory and applications of Calculus and Linear Algebra; It also aims to gradually develop in students an ability to apply these theoretical constructs to solve problems within Engineering domain. This course covers Integration of single variable functions and its applications, Differential calculus of single and multivariable functions, Matrix Algebra, Vector Spaces, Linear Transformation and Eigen value problems.						
Course Objectives: 1. To instill in prospective engineers knowledge of techniques in calculus, multivariate analysis and linear algebra. 2. To equip the students with intermediate to advanced level concepts and aligned tools to help them tackle advanced mathematics and related applications.						
Course Outcomes: After completion of the course, students would be able to: 1. Implement appropriate techniques of Differential and Integral Calculus to solve problems. 2. Demonstrate understanding of the fundamental concepts of Linear Algebra and carry out related computational skills. 3. Analyse functions, matrices and systems of linear equations. 4. Apply Calculus techniques and Algebraic skills to solve real life problems.						
Pedagogy: Lectures, tutorials, presentations, application-based videos, use of mathematical software.						
Textbooks: TB1. <i>Linear Algebra: A Modern Introduction</i> , 3 e, D. Poole, Brooks/Cole, 2010. TB2. <i>Higher Engineering Mathematics</i> , 1 e, B.V. Ramana, McGraw Hill Education, 2017. TB3. <i>Higher Engineering Mathematics</i> , 44 e, B.S. Grewal, Khanna Publishers, 2017.						
Reference Books: RB1. <i>Calculus</i> , 13 e, G. B. Thomas, Pearson 2014.						

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RB2. <i>Engineering Mathematics- I</i> , 1 e, Veerarajan T, McGraw-Hill Education, 2016.			
RB3. <i>Advanced Engineering Mathematics</i> , 10 e, Erwin Kreyszig, Wiley India, 2017.			
Links to websites:			
<ul style="list-style-type: none"> • http://mathworld.wolfram.com • http://www.math.com • https://ocw.mit.edu/index.htm 			
Evaluation Scheme:			
• Tutorial Test/Presentation/viva/quiz		30%	
• Mid Term		20%	
• Term End Exam		50%	
Total		100%	
Session	Topics	Pedagogical Tool	Textbook Chapters & Readings
Unit 1:	Integral Calculus	--	--
1.	Evaluation of definite and improper integrals <ul style="list-style-type: none"> • Definite integrals (Revision) • Improper Integrals of type I 	<ul style="list-style-type: none"> • Lectures • Problem Solving 	TB2: Chapter 6: Integral Calculus
2.	Evaluation of definite and improper integrals <ul style="list-style-type: none"> • Improper Integrals of type II • Improper Integrals of type III 		
3.	Beta, Gamma functions and their Properties <ul style="list-style-type: none"> • Introduction to Gamma function • Evaluation of integrals using Gamma function 		TB2: Chapter 11: Special Functions- Gamma, Beta Bessel and Legendre
4.	Beta, Gamma functions and their Properties <ul style="list-style-type: none"> • Introduction to Beta function • Relation between Beta and Gamma functions • Properties of Beta function 		
5.	Beta, Gamma functions and their Properties <ul style="list-style-type: none"> • evaluation of integrals using Beta function 		
6.	Applications of definite integrals to evaluate surface areas and volumes of revolutions. <ul style="list-style-type: none"> • Surface area 	<ul style="list-style-type: none"> • Lectures • Playing of animation video 	TB2: Chapter 6: Integral Calculus TB3: Chapter 6: Integration and its

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7.	Applications of definite integrals to evaluate surface areas and volumes of revolutions. • Volume of revolution	• Problem Solving	applications
Unit 2:	Differential Calculus	--	--
8.	Mean value theorems • Rolle's Mean value theorem • Lagrange's Mean value theorem	• Lectures • Problem Solving • Online tools for graphs	TB2: Chapter 2: Differential Calculus TB3: Chapter 4: Differentiation and Its Applications
9.	Mean value theorems, Taylor's theorem with remainder • Cauchy's Mean value theorem • Expanding functions using Taylor's theorem	• Lectures • Problem Solving	
10.	Taylor's and Maclaurin theorems with remainders • Taylor's expansion with remainder • Maclaurin series expansion with remainder		
11.	Maclaurin theorem with remainders • Maclaurin series expansion with remainder (continuation)		
12.	Indeterminate forms and L'Hospital's rule • Indeterminate forms $\frac{0}{0}, \frac{\infty}{\infty}, 0 \times \infty$		
13.	Indeterminate forms and L'Hospital's rule • Indeterminate forms $\infty - \infty, 0^0, \infty^0, 1^\infty$		
14.	Maxima and minima • Maxima and minima of one variable functions		
Unit 3:	Multivariable Differential Calculus	--	--
15.	Limit and continuity • Limit and continuity of multivariable functions	• Lectures • Problem Solving • Online tools	TB2: Chapter 3: Partial Differentiation



		Example: web.monroecc.edu/calcNSF/ (exploring multivariable calculus)	TB3: Chapter 5: Partial Differentiation and its Applications
16.	Partial derivatives <ul style="list-style-type: none"> • Introduction to Partial Derivatives • First and Second order Partial Derivatives of functions 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Online tools Example: web.monroecc.edu/calcNSF/ (exploring multivariable calculus)	
17.	Partial derivatives <ul style="list-style-type: none"> • Chain rule 	<ul style="list-style-type: none"> • Lectures • Problem Solving 	
18.	Gradient, directional derivatives <ul style="list-style-type: none"> • Gradient and its geometrical interpretation • Directional derivative 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Online tools web.monroecc.edu/calcNSF/ (exploring multivariable calculus) <ul style="list-style-type: none"> • Mathlets from https://ocw.mit.edu 	TB2: Chapter 15: Vector Differential Calculus TB3: Chapter 8: Vector Calculus
19.	Directional derivatives, total derivative <ul style="list-style-type: none"> • Properties of directional derivative • Total derivative 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Online tools from web.monroecc.edu/calcNSF/ (exploring multivariable calculus) 	
20.	Tangent plane and normal line <ul style="list-style-type: none"> • Tangent plane and normal line of surfaces 		
21.	Maxima, minima and saddle points <ul style="list-style-type: none"> • Second derivative test for Maxima, minima and saddle 	<ul style="list-style-type: none"> • Lectures • Problem Solving 	TB2: Chapter 4: Maxima Minima

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	points of two variable functions.	<ul style="list-style-type: none"> • Online tools from web.monroecc.edu/calcNSF/ (exploring multivariable calculus) 	TB3: Chapter 5: Partial Differentiation and its Applications
22.	Method of Lagrange multipliers <ul style="list-style-type: none"> • Method of Lagrange multipliers for constrained maxima and minima 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Mathlets from https://ocw.mit.edu 	
23.	curl and divergence <ul style="list-style-type: none"> • curl and divergence • solenoidal and irrotational vector field 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Mathlets from https://ocw.mit.edu 	TB2: Chapter 15: Vector Differential Calculus TB3: Chapter 8: Vector Calculus
Unit 4:	Vector Spaces and Linear Transformation	--	--
24.	Vector spaces <ul style="list-style-type: none"> • Definition and Examples of Vector Spaces 	<ul style="list-style-type: none"> • Lectures • Problem Solving 	TB1: Chapter 3: Matrices Chapter 6: Vector spaces
25.	Vector spaces <ul style="list-style-type: none"> • Subspace of a Vector Space and examples 		
26.	Linear independence of Vectors, Basis, Dimension <ul style="list-style-type: none"> • Test of independence and dependence of vectors • Basis of a Vector Space and Dimension 		
27.	Basis, Dimension <ul style="list-style-type: none"> • Basis and dimension of vector spaces and subspaces 		
28.	Linear transformations, Matrix associated with a linear map <ul style="list-style-type: none"> • Definition and examples of Linear Transformation • Matrix associated with a linear map 		

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29.	Matrix associated with a linear map <ul style="list-style-type: none"> Matrix associated with a linear map (continuation) one-one correspondence between Linear Transformation and Matrices 		
30.	Range and Kernal of a linear map, rank, nullity <ul style="list-style-type: none"> Determining Range and Kernal of a Linear map Determining rank and nullity 		
31.	Rank-nullity theorem Composition of linear maps <ul style="list-style-type: none"> rank-nullity theorem Composition of linear maps 		
32.	Inverse of a linear transformation <ul style="list-style-type: none"> Inverse of a linear transformation Matrix associated with the inverse of Linear Transformation 		
Unit 5:	Eigen Values and Vectors	--	--
33.	Determinant, Inverse <ul style="list-style-type: none"> Determinant (Revision) Inverse by adjoint method 	<ul style="list-style-type: none"> Lectures Problem Solving 	TB3: Chapter 2: Linear Algebra: Determinants, matrices
34.	Rank of matrix <ul style="list-style-type: none"> Rank of matrix by Echelon form 		
35.	Rank of matrix <ul style="list-style-type: none"> Rank of matrix by minor method 		
36.	System of linear equations <ul style="list-style-type: none"> solving systems of linear equations 		TB1: Chapter 2: System of Linear Equations
37.	System of linear equations <ul style="list-style-type: none"> solving systems of linear equations (continuation) 		TB3: Chapter 2: Linear Algebra: Determinants, matrices
38.	Eigenvalues and eigenvectors <ul style="list-style-type: none"> Introduction to Eigenvalues and eigenvectors Finding Eigenvalues and eigenvectors of matrices 	<ul style="list-style-type: none"> Lectures Problem Solving Applet from https://ocw.mit.edu 	TB1: Chapter 4: Eigen values Eigen vectors TB2: Chapter 14: Eigen Values and Eigen vectors
39.	Eigenvalues and eigenvectors <ul style="list-style-type: none"> For symmetric matrices 		<ul style="list-style-type: none"> Lectures Problem



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	<ul style="list-style-type: none"> • For skew symmetric matrices 	Solving <ul style="list-style-type: none"> • Discussion of real life examples 	Determinant, matrices
40.	Eigenvalues and eigenvectors <ul style="list-style-type: none"> • For orthogonal matrices 		
41.	Diagonalization of matrices <ul style="list-style-type: none"> • Testing if a matrix is diagonalizable • Finding the transforming matrix and diagonal matrix 		
42.	Cayley-Hamilton Theorem <ul style="list-style-type: none"> • Verification and application of Cayley-Hamilton Theorem 	<ul style="list-style-type: none"> • Lectures • Problem Solving 	
43, 44, 45	Beyond classroom activities; including remedial lectures, guest lectures and other extension activities.		

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Program: B. Tech. (I.T., Computer, EXTC, Mechanical, Civil, Mechatronics, Data Science)					Semester: I	
Course/Module: Basic Electrical Engineering					Module Code: BTIT01002, BTCT01002, BTET01002, BTME01002, BTCTI01002, BTMA01002, BTDS01003	
Teaching Scheme					Evaluation Scheme	
Classroom Session	Lecture (Hours per week)	Tutorial (Hours per week)	Practical/ Group work (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100 in Question Paper)
45	3	1	2	5	Marks Scaled to 50	Marks Scaled to 50
Course Rationale: This course aims to develop an understanding of analysis techniques applied to dc and ac circuits. It enhances the understanding of electrical and magnetic circuits through the study of basic concepts of electric and magnetic circuits, various theorems and electrical quantities.						
Course Objectives: <ol style="list-style-type: none"> 1. Equip the student to understand and solve simple ac and dc electrical and magnetic circuits using different theorems. 2. To enable the student to obtain a basic understanding of the working principle and applications of motors. 3. To impact hands-on experience in assembling and testing of circuits. 						
Course Outcomes: After completion of the course, students would be able to: <ol style="list-style-type: none"> 1. Analyze dc circuits using network theorems. 2. Understand and analyze AC circuits. 3. Discuss the working principle and applications of transformer, DC and AC machines. 4. Understand the concepts of power converter and electrical installation. 						
Pedagogy: <ol style="list-style-type: none"> 1. Classroom lectures and discussion. 2. Learning through conducting laboratory experiments and in-class problem solving. 3. Using the flipped classroom technique for participative learning. 4. Peer to Peer learning 						
Textbook: TB1. <i>Basic Electrical Engineering</i> , 1 e, D. C. Kulshreshtha, Tata McGraw Hill, 2009. TB2. <i>Electrical and Electronics Technology</i> , 10 e, E. Hughes, Pearson Education, 2013. TB3. <i>Power Electronics: Circuits, Devices and Applications</i> , 3 e, M. H. Rashid, Pearson Education India, 2009.						

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Reference Books:

- RB1. *Electrical Engineering Fundamentals*, 2 e, V. D. Toro, Prentice Hall India, 2010.
RB2. *Fundamentals of Electrical Engineering and Electronics*, 1 Multicolor e (Reprint 2009), B. L. Theraja, S. Chand & Co., 2006.

Links to websites:

- www.nptel.ac.in

Evaluation Scheme:

- | | |
|---|-------------|
| • Tutorial Test/ Presentation/viva/quiz | 30% |
| • Mid Term | 20% |
| • Term End Exam | 50% |
| Total | 100% |

Session Plan:

Session	Topics	Pedagogical Tool	Textbook Chapters & Readings
Unit 1	DC Circuits	--	--
1.	Electrical circuit elements (R, L and C), voltage and current sources	Class room discussion.	TB1: Chapter 2: Ohms law
2.	Kirchhoff's current law	Flipped Classroom using videos from nptel.ac.in/courses/108108076	TB1: Chapter 3: Network analysis TB2: Chapter 3: Simple DC circuits
3.	Kirchoff's voltage laws	Flipped Classroom using videos from nptel.ac.in/courses/108108076	TB1: Chapter 3: Network analysis TB2: Chapter 3: Simple DC circuits
4.	Analysis of simple circuits with dc excitation	Classroom discussion and numerical solving.	TB1: Chapter 3: Network analysis TB2: Chapter 3: Simple DC circuits
5.	Superposition Theorem	<ul style="list-style-type: none"> • Classroom discussion and numerical solving. • Laboratory experiment for verification of Superposition 	TB1: Chapter 4: Network theorems TB2: Chapter 4: Network theorem

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		Theorem.	
6.	Thevenin's Theorems.	<ul style="list-style-type: none"> Classroom discussion and numerical solving. Laboratory experiment for verification of Thevenin's Theorem. 	TB1: Chapter 4: Network theorems TB2: Chapter 4: Network theorem
7.	Norton's Theorems.	<ul style="list-style-type: none"> Classroom discussion and numerical solving. Laboratory experiment for verification of Norton's Theorem. 	TB1: Chapter 4: Network theorems TB2: Chapter 4: Network theorem
8.	Time-domain analysis of first-order RL circuits.	Peer Instructions using videos from nptel.ac.in	TB1: Chapter 8: DC Transients
9.	Time-domain analysis of first-order RC circuits	Peer Instructions using videos from nptel.ac.in	TB1: Chapter 8: DC Transients
Unit 2	AC Circuits	--	--
10.	Representation of sinusoidal waveforms, peak and rms values	<ul style="list-style-type: none"> Flipped classroom using videos from nptel.ac.in/courses/108108076 Demonstration of AC waveform parameters in laboratory 	TB1: Chapter 9: Alternating voltage and currents TB2: Chapter 9: Alternating voltage and current
11.	Phasor representation, real power, reactive power, apparent power, power factor.	Classroom discussion	TB1: Chapter 9: Alternating voltage and currents TB2: Chapter 9: Alternating voltage and current
12.	Analysis of single-phase ac circuits consisting of R, L and C circuits	<ul style="list-style-type: none"> Classroom discussion and numerical solving. Laboratory experiment on 1Φ R,L,C circuits 	TB1: Chapter 10: AC circuits TB2: Chapter 10: Single phase Series circuits Chapter 12: Power in AC Circuits
13.	Analysis of RL, RC circuits	<ul style="list-style-type: none"> Classroom discussion and numerical solving. 	TB1: Chapter 10: AC circuits

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		<ul style="list-style-type: none"> Laboratory experiment on 1Φ RL and RC circuits 	TB2: Chapter 10: Single phase Series circuits Chapter 11: Single phase Parallel Networks Chapter 12: Power in AC Circuits
14.	Analysis of series and parallel RLC circuits	<ul style="list-style-type: none"> Classroom discussion and numerical solving. Laboratory experiment on 1Φ RLC resonant circuits 	TB1: Chapter 10: AC circuits TB2: Chapter 10: Single phase Series circuits Chapter 11: Single phase Parallel Networks Chapter 12: Power in AC Circuits
15.	Resonance (series resonant circuit)	Classroom discussion	TB1: Chapter 11: Resonance in ac circuits TB2: Chapter 14: Resonance in AC Circuits
16.	Resonance (Parallel resonant)	<ul style="list-style-type: none"> Classroom discussion Laboratory experiment on Parallel RLC resonant circuits 	TB1: Chapter 11: Resonance in ac circuits TB2: Chapter 14: Resonance in AC Circuits
17.	Three-phase balanced circuits, voltage and current relations in star and delta connections.	Flipped classroom using videos from nptel.ac.in/courses/108108076 .	TB1: Chapter 12: Three phase circuits and systems
Unit 3	Transformers	--	--
18.	Magnetic materials, BH characteristics	Peer Instructions using videos from nptel.ac.in/courses/108108076 .	TB1: Chapter 13: Transformers TB2: Chapter 34: Transformers

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19.	Ideal and practical transformer, equivalent circuit	Peer Instructions using videos from nptel.ac.in/courses/108108076 .	TB1: Chapter 13: Transformers TB2: Chapter 34: Transformers
20.	Losses in transformers, regulation and efficiency	Peer Instructions using videos from nptel.ac.in/courses/108108076 .	TB1: Chapter 13: Transformers TB2: Chapter 34: Transformers
21.	Regulation and efficiency	<ul style="list-style-type: none"> Peer Instructions using videos from nptel.ac.in/courses/108108076. Laboratory experiment to determine regulation and efficiency of transformer 	TB1: Chapter 13: Transformers TB2: Chapter 34: Transformers
22.	Auto-transformer	Classroom discussion	TB1: Chapter 13: Transformers TB2: Chapter 34: Transformers
23.	Three-phase transformer connections	Classroom discussion	TB1: Chapter 13: Transformers TB2: Chapter 34: Transformers
24.	Three-phase transformer connections (cont.)	Classroom discussion	TB1: Chapter 13: Transformers TB2: Chapter 34: Transformers
Unit 4	Electrical Machines	--	--
25.	Generation of rotating magnetic fields	Flipped classroom using videos from nptel.ac.in/courses/108108076 .	TB1: Chapter 14: Alternators and synchronous motors TB2: Chapter 36: AC Synchronous Machine Windings
26.	Generation of rotating magnetic fields (Cont.)	Flipped classroom using videos from	TB1: Chapter 14: Alternators and

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		nptel.ac.in/courses/108108076.	synchronous motors TB2: Chapter 36: AC Synchronous Machine Windings
27.	Construction and working of a three-phase induction motor	<ul style="list-style-type: none"> Flipped classroom using videos from nptel.ac.in/courses/108108076. Demonstration of 3 Φ Induction motor constructional details in laboratory. 	TB1: Chapter 15: Induction motors TB2: Chapter 38: Induction motor
28.	Significance of torque-slip characteristic. Loss components and efficiency.	Classroom discussion.	TB1: Chapter 15: Induction motors TB2: Chapter 38: Induction motor
29.	Starting and Speed control of induction motor	Flipped classroom using videos from nptel.ac.in/courses/108108076.	TB1: Chapter 15: Induction motors TB2: Chapter 38: Induction motor
30.	Single-phase induction motor.	<ul style="list-style-type: none"> Classroom discussion Laboratory experiment on slip-torque characteristics of 1 Φ induction motor. 	TB1: Chapter 15: Induction motors TB2: Chapter 38: Induction motor
31.	Construction, working, torque-speed characteristic and speed control of separately excited dc motor	<ul style="list-style-type: none"> Flipped classroom using videos from nptel.ac.in/courses/108108076. Laboratory experiment on speed control of separately excited dc motor. 	TB1: Chapter 16: DC machines. TB2: Chapter 42: Direct current motors
32.	Construction and working of synchronous generators	Flipped classroom using videos from nptel.ac.in/courses/108108076.	TB1: Chapter 14: Alternators and synchronous motors TB2: Chapter 37: Characteristics of AC synchronous machines
Unit 5	Power Converters	--	--
33.	DC-DC buck and boost converters	<ul style="list-style-type: none"> Classroom discussion Flipped classroom 	TB2: Chapter 45: Power

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		using videos from http://nptel.ac.in/courses/108101038/	Electronics TB3: Chapter 5: DC-DC converter
34.	Duty ratio control	<ul style="list-style-type: none"> Classroom discussion and Numerical solving. Laboratory experiment on duty cycle control principal. 	TB2: Chapter 45: Power Electronics TB3: Chapter 6: Pulse width modulated inverters
35.	Single-phase inverters	<ul style="list-style-type: none"> Classroom discussion Laboratory experiment on single phase inverter. 	TB2: Chapter 45: Power Electronics
36.	Three-phase voltage source inverters, sinusoidal modulation	Classroom discussion	TB2: Chapter 45: Power Electronics TB3: Chapter 5: DC-DC converter Chapter 6: Pulse width modulated inverters
37.	Sinusoidal modulation	Classroom discussion	TB2: Chapter 45: Power Electronics TB3: Chapter 5: DC-DC converter Chapter 6: Pulse width modulated inverters
Unit 6	Electrical Installations	--	--
38.	Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB	Classroom discussion	TB1: Chapter 19: Electrical installation and illumination
39.	Types of Wires and Cables, Earthing. Types of Batteries	Classroom discussion and peer instructions.	TB1: Chapter 19: Electrical installation and illumination
40.	Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup	Classroom discussion and numerical solving.	TB1: Chapter 19: Electrical installation and illumination

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41.	Single-phase voltage source inverters	Classroom discussion	TBI: Chapter 19: Electrical installation and illumination
42.	Three-phase voltage source inverters	Classroom discussion	TBI: Chapter 19: Electrical installation and illumination
43, 44, 45	Beyond classroom activities; including remedial lectures, guest lectures and other extension activities.		

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Signature

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Program: B. Tech. (I.T., Computer, EXTC, Mechanical, Civil, Mechatronics & Data Science)					Semester: I	
Course/Module: Physics					Module Code: BTIT01003, BTKO01003, BTET01003, BTME01003, BTCIO1003, BTMA01003, BTDS01004	
Teaching Scheme					Evaluation Scheme	
Classroom Session	Lecture (Hours per week)	Tutorial (Hours per week)	Practical/ Group work (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100 in Question Paper)
45	3	1	2	5	Marks Scaled to 50	Marks Scaled to 50
Course Rationale: This course aims to introduce students with the different concepts of optics and its applications. Also, it aims to develop in students, an insight into applying the different laws of electromagnetism and quantum mechanics in everyday life.						
Course Objectives: 1. To enable students to understand the basic principles of optics, electricity and magnetism, quantum physics and their applications. 2. To enhance the student's ability to apply the principles of Physics in solving engineering problems in everyday life.						
Course Outcomes: After completion of the course, students would be able to: 1. Understand the principles of optics viz., diffraction polarization and apply same to different technologies like LASER and fiber optics. 2. Interpret the laws of electromagnetism and various terms related to electromagnetic properties of matter such as, permeability, polarization, etc. 3. Explain the basic laws related to quantum mechanics and apply them to solve simple quantum mechanical problems.						
Pedagogy: Work-based learning, Context-based learning, Adaptive Teaching						
Textbooks: TB1. <i>Optics</i> , 6e, Ajoy Ghatak, McGraw-Hill Education (India) Pvt. Ltd., 2017. TB2. <i>Introduction to electrodynamics</i> , 4e, D. J. Griffiths, Pearson Education Limited, 2015. TB3. <i>Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles</i> , 2e, R. Eisberg and R. Resnick, John Wiley & Sons, Indian Reprint, 2013.						
Reference Books: RB1. <i>Concept of Modern Physics</i> , 7e (SIE), A. Beiser, S. Mahajan and S. Choudhury, Tata McGraw Hill, 2015.						

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RB2. *Lectures on Physics Vol – I, Mainly Mechanics, Radiation, and Heat*, 1 e, R. Feynman, Pearson Education, 2016.

RB3. *Lectures on Physics Vol – II, Mainly Electromagnetism and Matter*, 1 e, R. Feynman, Pearson Education, 2016.

RB4. *Lectures on Physics Vol – III, Quantum Mechanics*, 1 e, R. Feynman, Pearson Education, 2016.

Links to websites:

- <http://nptel.ac.in/courses/115104096/>

Evaluation Scheme:

• Tutorial Test/Presentation/viva/quiz	30%
• Mid Term	20%
• Term End Exam	50%
Total	100%

Session Plan:

Session	Topics	Pedagogical Tool	Textbook Chapters & Readings
Unit 1:	Optics and Fiber Optics	--	--
1.	Introduction to interference and examples	<ul style="list-style-type: none"> • Class room lectures, • Learning by performing experiment 	TB1: Chapter 14: Two Beam Interference by Division of wavefront Chapter 15: Interference by Division of Amplitude
2.	Diffraction: Concept of diffraction, Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and multiple slits	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • Learning by performing experiment 	TB1: Chapter 18: Fraunhofer Diffraction I Chapter 20: Fresnel Diffraction
3.	Characteristics of diffraction grating and its applications.	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • Learning by performing experiment 	
4.	Polarization: Introduction, polarization by reflection, polarization by double refraction.	<ul style="list-style-type: none"> • Class room lectures, • Learning by performing experiment 	TB1: Chapter 22: Polarization and Double Refraction

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5.	Scattering of light, circular and elliptical polarization, optical activity.	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • Learning by performing experiment 	
6.	Fiber Optics: Introduction, optical fiber as a dielectric wave guide, total internal reflection	<ul style="list-style-type: none"> • Class room lectures, • Learning by performing experiment 	TB1: Chapter 28: Optical Fiber Basics using Ray Optics
7.	Numerical aperture and various fiber parameters, losses associated with optical fibers	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • Learning by performing experiment 	
8.	Step and graded index fibers, Application of optical fibers.	<ul style="list-style-type: none"> • Class room lectures 	
9.	Lasers: Introduction to interaction of non-ionizing radiation with matter	<ul style="list-style-type: none"> • Class room lectures 	
10.	Principles and working of laser: Population inversion, pumping, various modes, threshold, population inversion	<ul style="list-style-type: none"> • Class room lectures 	TB1: Chapter 27: LASERs: An Introduction
11.	Solid state LASER, Semiconductor LASER, Gas LASER.	<ul style="list-style-type: none"> • Class room lectures 	
12.	Application of lasers	<ul style="list-style-type: none"> • Class room lectures 	
Unit 2:	Electromagnetism and Magnetic Properties of Materials	--	--
13.	Laws of electrostatics	<ul style="list-style-type: none"> • Lectures • Problem Solving • Learning by performing experiment 	TB2: Chapter 2: Electrostatics
14.	Electric current and the continuity equation		TB2: Chapter 4: Electric fields in Matter
15.	laws of magnetism, Ampere's Faraday's laws		TB2: Chapter 5: Magnetostatics
16.	Maxwell's equations		TB2: Chapter 7: Electrodynamics

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17.	Polarization, Permeability and dielectric constant	<ul style="list-style-type: none"> • Lectures • Problem Solving • Learning by performing experiment • Literature survey 	TB2: Chapter 4: Electric fields in Matter
18.	Polar and non-polar dielectrics		
19.	Internal fields in a solid		
20.	Clausius-Mossotti equation		
21.	Applications of dielectrics		
22.	Magnetisation	<ul style="list-style-type: none"> • Lectures • Problem Solving • Learning by performing experiment • Literature survey 	TB2: Chapter 6: Magnetic fields in Matter
23.	Permeability and susceptibility		
24.	Classification of magnetic materials		
25.	Ferromagnetism, magnetic domains and hysteresis		
26.	Applications of magnetism		
Unit 3:	Quantum Mechanics	--	--
27.	Introduction to Quantum Physics	<ul style="list-style-type: none"> • Class room lectures, • Learning by performing experiment • By showing animated videos 	TB3: Chapter 1: Thermal Radiation and Planck's Postulate Chapter 2: Photons-Particle like Properties of Radiation
28.	Black body radiation		
29.	Explanation using the photon concept		
30.	Photoelectric effect		
31.	Compton effect		

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			like Properties of Radiation
32.	de Broglie hypothesis	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • Learning by performing experiment 	TB3: Chapter 3: De Broglie's Postulate-Wavelike Properties of Particles
33.	Wave-particle duality		TB3: Chapter 3: De Broglie's Postulate-Wavelike Properties of Particles
34.	Born's interpretation of the wave function		TB3: Chapter 3: De Broglie's Postulate-Wavelike Properties of Particles
35.	Verification of matter Waves		TB3: Chapter 3: De Broglie's Postulate-Wavelike Properties of Particles
36.	Uncertainty principle		TB3: Chapter 3: De Broglie's Postulate-Wavelike Properties of Particles
37.	Schrodinger wave Equation (Time Independent form)	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • By showing animated videos 	TB3: Chapter 5: Schrödinger's Theory of Quantum Mechanics
38.	Schrodinger wave Equation (Time dependent form)	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • By showing animated videos 	TB3: Chapter 5: Schrödinger's Theory of Quantum Mechanics
39.	Solution of Schrodinger wave equation	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • By showing animated videos 	TB3: Chapter 6: Solutions of Time-Independent Schrödinger Equations

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40.	Particle in box	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • By showing animated videos 	TB3: Chapter 6: Solutions of Time-Independent Schrödinger Equations
41.	Quantum harmonic oscillator	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • By showing animated videos 	TB3: Chapter 6: Solutions of Time-Independent Schrödinger Equations
42.	Hydrogen atom.	<ul style="list-style-type: none"> • Class room lectures, • Problem solving • By showing animated videos 	TB3: Chapter 6: Solutions of Time-Independent Schrödinger Equations
43, 44, 45	Beyond classroom activities; including remedial lectures, guest lectures and other extension activities.		

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Program: B. Tech. (I.T., Computer, EXTC, Mechanical, Civil, Mechatronics, Data Science)					Semester: I	
Course/Module: Engineering Graphics & Design					Module Code: BTIT01004, BTMCO01004, BTET01004, BTME01004, BTCIO1004, BTMA01004, BTDS01005	
Teaching Scheme					Evaluation Scheme	
Classroom Session	Lecture (Hours Per week)	Tutorial (Hours per week)	Practical/ Group work (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100 in Question Paper)
30	2	0	4	4	Marks Scaled to 50	Marks Scaled to 50
Course Rationale: This course is aimed at providing basic understanding of the fundamentals of Engineering Graphics; mainly visualization, graphics theory, standards & conventions of drawing, the tools of drawing and the use of drawings in engineering applications. The topics covered are tailored to suit the requirements of undergraduate studies in engineering. The course has been structured to include sufficient simulations which would aid the student in visualization of three dimensional objects and developing the drawing.						
Course Objectives: <ol style="list-style-type: none"> 1. To impart knowledge about engineering design and its place in society. 2. To introduce the visual aspects of engineering design. 3. To familiarize the aspects of engineering graphics standards. 4. To be able to create solid models. 5. To apply computer-aided geometric design concepts and creation of working drawings. 						
Course Outcomes: After completion of the course, students would be able to: <ol style="list-style-type: none"> 1. Interpret and communicate drawings effectively using different types of curves, lines, planes. 2. Analyze the concepts of projection and section of right regular solids with their development. 3. Apply the techniques, skills, and modern tools to create projections of machine components with the help of software. 						
Pedagogy: Lectures, Experiential learning activities, quizzes, application-based videos, use of drafting software.						
Textbooks: TB1. <i>Engineering Drawing</i> , 53 e, N. D. Bhatt, V. M. Panchal and P. R. Ingle, Charotar Publishing House, 2014.						
Reference Books: RB1. <i>Engineering Drawing and Computer Graphics</i> , 2 e, M. B. Shah and B. C. Rana, Pearson Education, 2009. RB2. <i>Engineering Drawing</i> , 6 e, K. Venugopal, New Age International (P) Ltd. Publishers, 2011.						
Links to websites: <ul style="list-style-type: none"> • http://nptel.ac.in/courses/112103019/ 						

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Evaluation Scheme:			
• Drawing Hall Sheets and AutoCAD Prints		30 %	
• Mid Term		20 %	
• Term End Exam		50 %	
Total		100 %	
Session Plan:			
Session	Topics	Pedagogical Tool	Textbook Chapters & Readings
Unit 1:	Introduction to Engineering Drawing	--	--
1.	Principles of Engineering Graphics and their significance.	<ul style="list-style-type: none"> Lectures Application-based videos 	TB1: Chapter 1: Drawing instruments and Their Uses
2.	Usage of Drawing instruments, lettering, numbering.	<ul style="list-style-type: none"> Lectures Application-based videos 	TB1: Chapter 1: Drawing instruments and Their Uses
3.	Conic sections including the Rectangular Hyperbola (General method only)	<ul style="list-style-type: none"> Lectures Problem Solving 	TB1: Chapter 6: Curves used in Engineering
4.	Cycloid, Epi-cycloid, Hypo-cycloid and Involutives; Scales – Plain, Diagonal and Vernier Scales	<ul style="list-style-type: none"> Lectures Problem Solving 	TB1: Chapter 6: Curves used in Engineering
Unit 2:	Projections of Lines and Planes	--	--
5.	Introduction to Projections of Points; Conventions; Points locating in all Quadrants	<ul style="list-style-type: none"> Lectures Application-based videos 	TB1: Chapter 10: Projections of Lines
6.	Projections of Lines; inclined to One plane, Parallel to planes	<ul style="list-style-type: none"> Lectures Application-based videos 	TB1: Chapter 10: Projections of Lines
7.	Projections of lines inclined to both planes	<ul style="list-style-type: none"> Lectures Application-based videos 	TB1: Chapter 10: Projections of Lines
8.	Practice session on Projections of lines including elevation length (EL) and plan length (PL)	<ul style="list-style-type: none"> Lectures Application-based videos 	TB1: Chapter 10: Projections of Lines
9.	Projections of Planes: Introduction, types of planes	<ul style="list-style-type: none"> Lectures Problem Solving 	TB1: Chapter 11: Projection of Planes
10.	Projection of Auxiliary Planes	<ul style="list-style-type: none"> Lectures Problem Solving 	TB1: Chapter 11: Projection of Auxiliary Planes Chapter 12: Projection of Planes

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Unit 3:	Projections of Regular Solids	--	--
11.	Projections of Regular Solids covering those inclined to both the Planes for Prisms Auxiliary Views	<ul style="list-style-type: none"> Lectures Problem Solving Application-based videos 	TB1: Chapter 13: Projection of Solids
12.	Projections of Regular Solids covering those inclined to both the Planes for Pyramids Auxiliary Views	<ul style="list-style-type: none"> Lectures Problem Solving Application-based videos Experiential learning activities 	TB1: Chapter 13: Projection of Solids
13.	Projections of Regular Solids covering those inclined to both the Planes for Cones and Cylinders Auxiliary Views	<ul style="list-style-type: none"> Lectures Problem Solving Application-based videos Experiential learning activities 	TB1: Chapter 13: Projection of Solids
14.	Projections of Regular Solids covering those inclined to both the Planes for Cylinders	<ul style="list-style-type: none"> Lectures Problem Solving Application-based videos 	TB1: Chapter 13: Projection of Solids
Unit 4:	Section and Development of Regular Solids	--	--
15.	Introduction to Section and Development of Regular Solids	<ul style="list-style-type: none"> Lectures Problem Solving Application-based videos Experiential learning activities 	TB1: Chapter 14: Section of Solids
16.	Section of Regular Prism– Auxiliary Views;	<ul style="list-style-type: none"> Lectures Problem Solving Application-based videos Experiential learning activities 	TB1: Chapter 14: Section of Solids
17.	Section of Regular Cylinder – Auxiliary Views;	<ul style="list-style-type: none"> Lectures Problem Solving Application-based videos Experiential learning activities 	TB1: Chapter 14: Section of Solids
18.	Section of Regular Pyramid – Auxiliary Views;	<ul style="list-style-type: none"> Lectures Problem Solving Application- 	TB1: Chapter 14: Section of Solids

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		<ul style="list-style-type: none"> • based videos • Experiential learning activities 	
19.	Section of Regular Cone – Auxiliary Views;	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos • Experiential learning activities 	TB1: Chapter 14: Section of Solids
20.	Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos • Experiential learning activities 	TB1: Chapter 14: Section of Solids
21.	Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos • Experiential learning activities 	TB1: Chapter 14: Section of Solids
22.	Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos • Experiential learning activities 	TB1: Chapter 14: Section of Solids
Unit 5: Orthographic Projections		--	--
23.	<ul style="list-style-type: none"> • Principles of Orthographic projection- Conventions Quadrant formation and Projections of Points 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos 	TB1: Chapter 13: Projection of Solids
24.	<ul style="list-style-type: none"> • Conversion of Orthographic Views to Isometric Views and Vice-versa, Conventions; 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos 	TB1: Chapter 13: Projection of Solids
Unit 6: Sectional Orthographic Projections			
25.	<ul style="list-style-type: none"> • Principles of Sectional Orthographic projection, need of sectional views 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos 	TB1: Chapter 8: Orthographic Projection
26.	<ul style="list-style-type: none"> • Sectional Orthographic projection; types of sections; hatching of 	<ul style="list-style-type: none"> • Lectures • Problem Solving 	TB1: Chapter 8: Orthographic

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	sectioned part and principles	<ul style="list-style-type: none"> • Application-based videos 	Projection
27.	Draw the sectional orthographic views of geometrical solids, objects from industry	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos 	TB1: Chapter 8: Orthographic Projection
28.	Draw the sectional orthographic views of geometrical dwellings (foundation to slab only)	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos 	TB1: Chapter 8: Orthographic Projection
Unit 7:	Isometric Projections	--	--
29.	<ul style="list-style-type: none"> • Principles of Isometric projection- Isometric Scale, Isometric Views, Conventions; Isometric views of lines, Planes, Simple and compound Solids; 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos 	TB1: Chapter 17: Isometric Projection
30.	<ul style="list-style-type: none"> • Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions; 	<ul style="list-style-type: none"> • Lectures • Problem Solving • Application-based videos 	TB1: Chapter 17: Isometric Projection
<p>*Note:</p> <ul style="list-style-type: none"> • Minimum four drawing sheets to be completed in drawing hall covering contents from Unit 1 to unit 4. • Minimum Six drawing sheets to be completed in CAD practical session covering contents from Unit 5 to unit 7 by using suitable drafting software (AutoCAD). 			

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Program: B. Tech. (I.T., Computer, EXTC, Mechanical, Civil, Mechatronics, Data Science)					Semester: I	
Course/Module: Constitution of India					Module Code: BTIT01005, BTCT01005, BTET01005, BTME01005, BTCTI01005, BTMA01005, BTDS01006	
Teaching Scheme					Evaluation Scheme	
Classroom Session	Lecture (Hours per week)	Tutorial (Hours per week)	Practical/ Group work (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE)
30	2	0	0	0	Marks Scaled to 50	--
Course Rationale:						
<p>Constitution is the basic law of the land for any nation, and it is expected for its citizens to have knowledge of it. This course aims to ingrain into the student's mind the basic principles of Constitution of India. Students are already exposed to Preamble of the constitution, but the exposure is only superficial. This course aims at providing in depth rationale behind the Preamble. It also aims to provide knowledge with respect to fundamental rights provided in the Constitution and permissible restrictions upon it and the institutions within 'State' and their inter-relation with each other. Topics covered in this course consists of the evolution and nature of the Indian Constitution, Preamble, Fundamental rights and duties, Directive Principles of State Policy, the Union Parliament, Federal structure of Indian polity, Indian Judiciary, Emergency provisions and Amendment powers and its usage since inception of Constitution till date.</p>						
Course Objectives:						
<ol style="list-style-type: none"> 1. To enable the students to understand the principles mentioned in our Constitution and apply them in regular course of activities, personal or professional. 2. To enable them to know the structure of Indian polity, legal framework and inter-relations of institutions of 'State' in India 						
Course Outcomes:						
<p>After completion of the course, students would be able to:</p> <ol style="list-style-type: none"> 1. Understand the historic evolution of the Indian Constitution, its drafting, nature and to understand the principles mentioned in its Preamble. 2. Inculcate fundamental rights in its true sense and also the permissible restrictions upon it so as to enjoy these rights within permissible limits while simultaneously performing their duties and concept of Directive Principles of State policy and to apply these principles into their professional lives. 3. Ingrain the structure of our polity and inter-relation of various organs of State – Legislature (Parliament), Executive (Government) and Judiciary (Courts) and also relation between Union, States and Local Self Governments and amendment of the Constitution by the Parliament. 4. Attain knowledge of the Emergency provisions, when and how it is imposed, to know the additional powers the bestowed upon the Government at times of Emergency and to understand the Amendment procedure. 						

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Pedagogy: Lectures, presentations and group discussions.			
Textbooks: TB1. <i>Introduction to the Constitution of India</i> , 22 e, Dr. Durga Das Basu, Lexis Nexis, 2016.			
Reference Books: RB1. <i>The Constitution of India</i> , 14 e, P. M. Bakshi, Universal Law Publishing, 2017. RB2. <i>Constitutional Law of India</i> , 54 e, J. N. Pandey, Central Law Agency, 2017. RB3. <i>We the people</i> , N. A. Palkhivala, UBS Publishers Distributors, 1999.			
Evaluation Scheme:			
	• Presentation/viva/quiz/Assignment	60%	
	• Mid Term	40%	
	Total	100%	
Session Plan:			
Session	Topics	Pedagogical Tools	Textbook Chapters & Readings
Unit 1:	Evolution of Indian Constitution:	--	--
1.	Historic development of drafting and framing of Constitution	Lectures	TB1: Chapter 1: The Historical Background Chapter 2: The Making of the Constitution
2.	Meaning of Constitution and Constitutionalism	Lectures	TB1: Chapter 3: The Philosophy of the Constitution
3.	Nature and Characteristics of our Constitution	Lectures	TB1: Chapter 4: Outstanding Features of our Constitution
4.	Preamble, its meaning and principles mentioned therein	Lectures	TB1: Chapter 5: Nature of the Federal System
Unit 2:	Fundamental rights, Fundamental duties and Directive Principles of State Policy	--	--
5.	Concept of 'State' and Status of Laws which are in derogation with Fundamental rights	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
6.	Right to Equality under Article 14	<ul style="list-style-type: none"> • Lecture • Presentations 	TB1: Chapter 8: Fundamental Rights

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		<ul style="list-style-type: none"> • Group Discussions 	and Duties
7.	Related Rights under equality mentioned in Article 15,16,17 and 18	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
8.	Right to freedom of Speech and Expression under Art. 19(1)(a)	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
9.	Right to other freedoms mentioned in Art. 19	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
10.	Rights under Art. 20	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
11.	Right to Life	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
12.	Other factors governing Right to life	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
13.	Rights against exploitation, forced labour and Protection given to children below 14 years of age under Art. 23 and 24 respectively	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
14.	Religious Rights given to individuals under Art. 25	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
15.	Religious Rights given to institutions under Art. 26 and 27	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties

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16.	Right to minorities under Art. 29 and 30	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
17.	Right to Constitutional Remedies under Art. 32	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
18.	Fundamental Duties	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
19.	Directive Principles of State Policy	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 8: Fundamental Rights and Duties
Unit 3:	Union, States and Inter-relation between them	--	--
20.	<ul style="list-style-type: none"> • Union Parliament • Federal Structure of Indian Polity 	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 5: Nature of the Federal System Chapter 11: The Union Executive Chapter 12: The Union Legislature
21.	Distribution of powers between Union and States	<ul style="list-style-type: none"> • Lecture • Presentations 	TB1: Chapter 24: Distribution of Legislative and Executive Powers Chapter 26: Administrative Relations between the Union and the States
22.	Local Self Government in India	Lecture	TB1: Chapter 26: Administrative Relations between the Union and the States
Unit 4:	Indian Judiciary and Lok Adalats	--	--
23.	<ul style="list-style-type: none"> • The Supreme Court of India • Powers and Jurisdictions of Supreme Court 	<ul style="list-style-type: none"> • Lecture • Presentations • Group 	TB1: Chapter 21: Organisation of the Judiciary in General

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		Discussions	Chapter 22: The Supreme Court
24.	High Courts and Lok Adalats	Lectures	TB1: Chapter 23: The High Court
Unit 5:	Emergency Provisions	--	--
25.	National Emergency under Article 352 and 353, its method of enforcement and its implications	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 28: Emergency Provisions
26.	Failure of Constitutional Machinery in a State and Financial Emergency	<ul style="list-style-type: none"> • Lecture • Presentations • Group Discussions 	TB1: Chapter 28: Emergency Provisions
Unit 6:	Amendments	--	--
27.	<ul style="list-style-type: none"> • Amendment procedure in Constitution • Limits on power of Parliament to amend Constitution 	Lecture	TB1: Chapter 10: Procedure for Amendment
28.	Historical perspective of amendments made so far and theories devolved by judgements of Courts	Lecture	TB1: Chapter 10: Procedure for Amendment
29, 30	Beyond classroom activities; including remedial lectures, guest lectures and other extension activities.		

Signature

(Prepared by Concerned Faculty/HOD)



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